AMENDMENTS TO THE SPECIFICATION

Please amend the Specification as follows.

Please replace the first full paragraph on page 8, beginning at line 1, with the following:

$$|r_1\text{-}h_1s_1\text{-}h_2s_2\text{-}h_3s_3|^2+|r_2\text{-}h_1s_4\text{-}h_2s_5\text{-}h_3s_6|^2$$
$$+|r_3\text{-}h_1s_7\text{-}h_2s_8\text{-}h_3s_9|^2+|r_4\text{-}h_1s_{10}\text{-}h_2s_{11}\text{-}h_3s_{12}|^2$$

$$\underline{\begin{aligned}&|r_1 - h_1s_1 - h_2s_2 - h_3s_3|^2 + |r_2 - h_1s_4 - h_2s_5 - h_3s_6|^2\\ &+ |r_3 - h_1s_7 - h_2s_8 - h_3s_9|^2 + |r_4 - h_1s_{10} - h_2s_{11} - h_3s_{12}|^2\end{aligned}} \qquad \ldots\ldots (4)$$

where r_1, r_2, r_3 and r_4 are signals received at the receiver for 4 time intervals, respectively, and h_1, h_2 and h_3 are channel gains representing channel coefficients from 3 transmission antennas to a reception antenna.---

Please replace the first paragraph on page 10, beginning at line 1, with the following:

---When at least 2 crossover terms C_1 and C_2 are removed using the encoding matrixes of Equation (8), an ML detection scheme of a receiver can be simplified even further. For example, if Equation (4) is expressed again by applying the encoding matrix of Equation (7), minimizing Equation (4) is identical to minimizing Equation (9) and Equation (10) below. This is possible because a metric of Equation (9) and a metric of Equation (10) are independent of each other.

$$\cancel{Min(x_1,x_3)(|R_1-x_1|^2+|R_3-x_3|^2+2(C_1+C_3)Re\{x_1^*x_3\})}$$

$$\underline{Min(x_2,x_4)(|R_2 - x_2|^2 + |R_4 - x_4|^2 + 2(C_2 + C_4)\operatorname{Re}\{x_2^* x_4\})} \qquad \ldots(9)$$

$$\cancel{Min(x_2, x_4)(|R_2 - x_2|^2 + |R_4 - x_4|^2 + 2(C_2 + C_4)Re\{x_2^* x_4\})}$$

$$\underline{Min(x_1, x_3)(|R_1 - x_1|^2 + |R_3 - x_3|^2 + 2(C_1 + C_3)\mathrm{Re}\{x_1^* x_3\})} \quad \ldots(10)$$

where "Min(a,b)(y(a,b))" means determining "a,b" that minimizes "y(a,b)," and "Re{}" means calculating a real component for a complex number in braces. In addition, C_1 and C_2 become 0 as mentioned above, and $C_3=h_3^*h_2-h_3h_2^*$ and $C_4=h_3h_2^*-h_3^*h_2=-C_3$. Moreover, $R_1=r_1h_1^*+r_2^*h_2+r_3^*h_3$, $R_2=r_1h_2^*-r_2^*h_1+r_4h_3^*$, $R_3=r_2^*h_3+r_4h_1^*-r_3^*h_2$, and $R_4=r_1h_3^*-r_3^*h_1-r_4h_2^*$. ---

Please replace the last paragraph on page 10 and continuing onto page 11, with the following:

---Meanwhile, when input symbols were generated by BPSK (Binary Phase Shift Keying), the above-stated encoding matrix always has a diversity order of 3. However, when a symbol mapping scheme of a 3rd or higher order using a complex constellation, i.e., QPSK (Quadrature Phase Shift Keying), 8PSK (8-ary Phase Shift Keying) and 16PSK (16-ary PSK), is used, transmission symbols become complex symbols, so a diversity order is reduced to 2. Therefore, the invention secures a maximum diversity order 3 by phase-rotating each of 2 symbols that determine different metric values, among 4 symbols, by a predetermined phase value. Then, symbols finally transmitted via 3 antennas are expressed as

$$\left(\begin{array}{ccc} e^{j\theta_1}s_1 & s^2 & e^{j\theta_4}s_4 \\ -s_2^* & e^{-j\theta_1}s_1^* & s_3^* \\ \hline -e^{-j\theta_4}s_4^* & -s_3^* & e^{-j\theta_1}s_1^* \\ s_3 & -e^{j\theta_4}s_4 & s_2 \end{array}\right)$$

$$\underline{\begin{pmatrix} e^{j\theta_1} s_1 & s_2 & e^{j\theta_4} s_4 \\ -s_2^* & e^{-j\theta_1} s_1^* & s_3^* \\ -e^{-j\theta_4} s_4^* & -s_3^* & e^{-j\theta_1} s_1^* \\ s_3 & -e^{j\theta_4} s_4 & s_2 \end{pmatrix}} \quad \ldots\ldots(11)$$

Equation (11) shows an encoding matrix for phase-rotating s_1 and s_4 among input symbols s_1, s_2, s_3 and s_4 of Equation (7) by θ_1 and θ_2, respectively. In another case, it is possible to rotate a symbol pair of (s_1,s_2), (s_3,s_4) or (s_2,s_3) related to different matrixes. Although phase values by which the 2 symbols are rotated respectively are different from or identical to each other, a diversity order is always maintained at 3. Likewise, if 2 symbols that determine different metric values are phase-rotated by a predetermined phase value even for the other encoding matrixes of Equation (8), final encoding matrixes can be obtained. ---

Please replace the third full paragraph on page 12, beginning at line 21, with the following:

--- For example, when s_1 and s_4 among 4 input symbols s_1, s_2, s_3 and s_4 are phase-rotated by θ_1 and θ_2, respectively, an output of the encoder 230 can be expressed in a 4×3 encoding matrix of Equation (11) above. When the encoding matrix of Equation (11) is used, 3 symbols $e^{j\theta_1} s_1$, s_2 and $e^{j\theta_4} s_4$ in a first row are delivered to the 3 antennas 240, 242 and 244, respectively, in a first time interval and symbols s_3, $\cancel{e^{j\theta_4} s_4}$ $\underline{e^{j\theta_4} s_4}$ and s_2 in the last 4th row are delivered to the 3 antennas 240, 242 and 244, respectively, in the last 4th time interval.---

Please replace the third full paragraph on page 14, beginning at line 18, with the following:

---It can be understood from the result of FIG. 5 that when all phase values exist at around 45°,

the minimum coding gain becomes flat. Therefore, a phase value preferable in the first embodiment of the invention is 45°. FIG. 6 illustrates a QPSK constellation which is phase-rotated by 45°. As illustrated, the phase-rotated symbols are situated on a real axis or an imaginary axis. According to the first embodiment of the invention, a preferable phase rotation range is between 21° and 69° centering on 45° for QPSK, between 21° and 24° for 8PSK, and is 11.25° for 16PSK~~, centering on 45°~~. However, the invention is not restricted to the figures, and the preferable phase rotation range shall be set according to characteristics of the system.---

Please replace the second full paragraph on page 16, beginning at line 16, with the following:

---If a metric value is calculated with channel gains h_1, h_2 and h_3 from 3 transmission antennas to a reception antenna for Equation (14), it becomes

$$|r_1-h_1e^{-j\theta_1}s_1-h_2e^{-j\theta_2}s_2-h_3s_3|^2+|r_2-h_1s_3-h_2e^{-j\theta_1}s_1-h_3e^{-j\theta_2}s_2|^2 +|r_3-h_1e^{-j\theta_2}s_2-h_2s_3-h_3e^{-j\theta_1}s_1|^2$$

$$|r_1-h_1e^{-j\theta_1}s_1-h_2e^{-j\theta_2}s_2-h_3s_3|^2+|r_2-h_1s_3-h_2e^{-j\theta_1}s_1-h_3e^{-j\theta_2}s_2|^2 +|r_3-h_1e^{-j\theta_2}s_2-h_2s_3-h_3e^{-j\theta_1}s_1|^2 \quad \ldots(15)$$

A receiver then determines symbols s_1 to s_3 that minimize Equation (15). ---

Please replace the first paragraph on page 17, beginning at line 1, with the following:

--- FIG. 8 is a block diagram illustrating a structure of a transmitter using a space-time block code according to a second embodiment of the present invention. As illustrated, the ~~receiver~~

transmitter is comprised of an S/P converter 510, two phase rotators 520 and 522, an encoder 530, and three transmission antennas 540, 542 and 544.---